Explanatory Statement

Issued by the Authority of the Parliamentary Secretary for Climate Change and Energy Efficiency

Carbon Credits (Carbon Farming Initiative) Act 2011

Carbon Farming (Destruction of Methane Generated from Manure in Piggeries) Methodology Determination 2012

Background

The Carbon Credits (Carbon Farming Initiative) Act 2011 (the Act) enables the crediting of greenhouse gas abatement in the land sector. Greenhouse gas abatement is achieved by either reducing or avoiding emissions or by removing carbon from the atmosphere and storing it in soil or trees.

Abatement activities are undertaken as offsets projects. The process involved in establishing an offsets project is set out in Part 3 of the Act. An offsets project must be covered by and undertaken in accordance with a methodology determination.

Subsection 106 (1) of the Act empowers the Minister, by legislative instrument, to make a determination known as a methodology determination. The purpose of a methodology determination is to establish procedures for estimating abatement (emissions reductions and sequestration) and project rules for monitoring, record keeping and reporting on abatement.

A methodology determination must meet the offsets integrity standards set out in section 133 of the Act and the other eligibility criteria set out in section 106 of the Act. The Minister cannot make a methodology determination unless the Domestic Offsets Integrity Committee (DOIC) has endorsed the proposal under section 112 of the Act and advised the Minister of the endorsement under section 113 of the Act. The DOIC is an independent expert panel established to evaluate and endorse proposals for methodologies.

Application of the Methodology Determination

The Carbon Farming (Destruction of Methane Generated from Manure in Piggeries) Methodology Determination 2012 (the Methodology Determination) sets out the detailed rules for implementing and monitoring a project under the Carbon Farming Initiative (CFI) to reduce the methane generated from manure in piggeries.

Waste management in conventional piggeries involves the collection and storage of manure in uncovered lagoons, where methane is produced by the anaerobic decomposition of organic matter in waste and, in the absence of any abatement activity, is emitted into the atmosphere.

The abatement activity involves collecting the emitted gas by covering open lagoons to prevent the release of biogas containing methane. This will require the installation and
operation of covers and gas capture and combustion equipment to existing uncovered treatment lagoons, or alternatively the replacement of conventional lagoons with covered lagoon systems. Piggery farmers will be able to use the captured emissions to produce heat and electricity, or destroy it through the use of flares.

Project proponents wanting to implement the Methodology Determination must make an application to the Clean Energy Regulator (the Regulator) and meet the eligibility requirements for an offsets project set out in Subsection 27 (4) of the Act. These requirements include compliance with the rules set out in the Methodology Determination.

Offsets projects that are undertaken in accordance with the Methodology Determination and approved by the Regulator can generate Australian carbon credit units that can be sold to:

(a) Australian companies that must pay the carbon price established under the Clean Energy legislation when implemented;

(b) overseas entities that pay a carbon price; and

(c) businesses in Australia and overseas wanting to offset their own carbon pollution.

Public Consultation

The methodology was developed by the Department of Climate Change and Energy Efficiency (the Department) in collaboration with a technical working group made up of representatives from the industry and Australian Government.

The draft methodology was published on the Department’s website for public consultation from 27 June 2011 to 26 July 2011. Stakeholders and members of the public who asked to be listed on the mailing list maintained by the Department were notified of the public consultation period.

The Interim DOIC considered the issues raised in public submissions during its assessment of the methodology as required under subsection 112 (5) of the Act.

Sections 131 and 132 of the Act contain transitional provisions for the consideration of methodologies by the Interim DOIC prior to the commencement of the Act.

Determination Details

The Methodology Determination is a legislative instrument within the meaning of the Legislative Instruments Act 2003.

The Methodology Determination commences retrospectively from 1 July 2010.

Subsection 12 (2) of the Legislative Instruments Act 2003 provides that, for a legislative instrument to have effect before the date it is registered, it must not adversely affect the rights of any person or impose a liability on any person in respect of anything done or not done before the date of registration. The Methodology Determination does not offend against these requirements. Retrospective application confers a benefit in that it allows persons to apply for and generate Australian Carbon Credit Units in circumstances where they would not normally be eligible to apply.
Details of the Methodology Determination are at Attachment A.

A Statement of Compatibility prepared in accordance with the Human Rights (Parliamentary Scrutiny) Act 2011 is at Attachment B.
Details of the Methodology Determination

Part 1 Preliminary

1.1 Name of the Determination

This section provides that the name of the Methodology Determination is the **Carbon Farming (Destruction of Methane Generated from Manure in Piggeries) Methodology Determination 2012.**

1.2 Commencement

This section provides that the Methodology Determination commences retrospectively from 1 July 2010.

Subsection 122 (3) of the Act provides that if a methodology determination is made on or before 30 June 2012, the determination may be expressed to have come into force on 1 July 2010.

1.3 Application of the Methodology Determination

The effect of paragraph 106 (1) (a) of the Act is that a Methodology Determination must be expressed to apply to a specific kind of offsets project. This section of the Methodology Determination explains that the instrument applies to a project that involves the capture of biogas generated by the decomposition of piggery manure waste in the circumstances set out in Part 2 of the Methodology Determination.

Waste management in conventional piggeries involves the collection and storage of manure in uncovered lagoons. Methane (CH$_4$) is produced by the anaerobic decomposition of organic matter in the waste, and in the absence of any abatement, is emitted into the atmosphere. The abatement activity requires the use of lagoon covers and gas capture and combustion equipment which can be existing installations within existing piggeries, retrofitted to existing lagoons within existing piggeries, installed in new lagoons within existing piggeries or installed in new piggeries. The methane component of the biogas is combusted using flares, and/or an electricity generation system, and/or a gas boiler, which converts methane to carbon dioxide through combustion.

1.4 Definitions

This section defines a number of terms used in the Methodology Determination.

Where the Methodology Determination refers to United States Environment Protection Authority (US EPA) methods, a link to those methods is provided on the Department’s website. Those methods are also available on the website of the US EPA.

Generally, where terms are not defined in the Methodology Determination, they have the meaning given by section 5 of the Act or the regulations.
Part 2 Requirements for an eligible offsets project

2.1 Requirements that must be met for an offsets project to be an eligible offsets project

The effect of paragraph 106 (1) (b) of the Act is that a Methodology Determination must set out the requirements that must be met for the offsets project to be an eligible offsets project.

This section of the Methodology Determination explains that the project must consist of the following activities:

a) using covered lagoons to prevent release of biogas (containing methane) into the atmosphere;

b) collecting the gas from the covered lagoon; and

c) combusting the methane component in the gas to convert it to carbon dioxide.

The use of anaerobic ponds is a standard method for treating piggery manure. The Methodology Determination requires that project lagoons to have a minimum depth of 2 metres, and meet the best practice principles in the National Environmental Guidelines for Piggeries 2010. These guidelines are available on the Australian Pork Limited website, and a link to these guidelines is provided on the Department’s website.

The input to the lagoon must only consist of effluent from the operation of piggery sheds in the project. Effluent from shed operations may include undigested feed and any bedding which would, under normal operations, enter the effluent stream.

Part 3 Calculating the carbon dioxide equivalent Net abatement amount for a project in relation to a reporting period

Division 3.1 Preliminary

The effect of paragraph 106 (1) (b) of the Act is that a Methodology Determination must set out rules for ascertaining the carbon dioxide equivalent net abatement amount for an offsets project. This section of the Methodology Determination sets out the requirements for ascertaining that abatement.

3.1 General

This section clarifies that all calculations are in respect of activities done or outcomes achieved during the reporting period for a project, and requires that the data used in calculations must comply with the data collection requirements set out in Division 3.3 of the Methodology Determination.

A number of the calculations require the use of a factor or parameter prescribed in the National Greenhouse and Energy Reporting (Measurement) Determination 2008 (NGER Measurement Determination) and the National Greenhouse and Energy Reporting Regulations 2008 (NGER Regulations), both of which are amended from time to time.

Paragraph 3.1 (2) (c) of the Determination provides that all calculations performed under Division 3.1 must use the factor or parameter which is prescribed in the relevant NGER
Measurement Determination or NGER Regulations in force at the time that the report is submitted or is required, whichever is earlier. This is the case even if a different value was in effect for the factor or parameter earlier in the reporting period.

For the purpose of this paragraph the factors and values are listed in the following table:

<table>
<thead>
<tr>
<th>Factor or Parameter</th>
<th>Reference</th>
<th>Value of Factor or Parameter at 1 January 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\gamma$</td>
<td>The factor converting cubic metres of methane at standard conditions to tonnes of CO$_2$-e as stated in the <em>NGER Measurement Determination</em> Part 5.2</td>
<td>$6.784 \times 10^{-4} \times 21$</td>
</tr>
<tr>
<td>$OF$</td>
<td>The oxidation factor for near surface methane in a landfill as stated in the <em>NGER Measurement Determination</em> Part 5.2</td>
<td>0.1</td>
</tr>
<tr>
<td>$EC_{\text{biogas}}$</td>
<td>The energy content factor for landfill biogas that is captured for combustion as stated in the <em>NGER Measurement Determination</em> Schedule 1 Part 2</td>
<td>$37.7 \times 10^{-3}$ GJ/m$^3$</td>
</tr>
<tr>
<td>$GWP_{\text{CH}_4}$</td>
<td>The global warming potential of methane as stated in the <em>NGER Regulations 2008.</em></td>
<td>21</td>
</tr>
<tr>
<td>$EF_{\text{N}_2\text{O}}$</td>
<td>The emission factor for nitrous oxide (N$_2$O) from landfill biogas that is captured for combustion as stated in the <em>NGER Measurement Determination</em> Schedule 1 Part 2</td>
<td>0.03 kg CO$_2$-e/GJ</td>
</tr>
</tbody>
</table>

$1$ Global Warming Potential is an index that measures the heat absorbing ability and the decay rate of a well mixed greenhouse gas in the atmosphere over a time interval, relative to that of carbon dioxide.
3.2 Greenhouse gas assessment boundary

This section describes the greenhouse gas emissions and sequestration that need to be assessed in order to determine the total net change in greenhouse gas emissions resulting from a project abatement activity.

Emissions and sources that must be accounted for in the abatement calculations include:

a) emissions from anaerobically treated waste in project lagoons;

b) grid-derived electricity and/or fuel used in the process of gas capture and combustion (for example, pumps and engines are used in the operation of flares, as well as in the operation of control and monitoring systems);

c) emissions from gas capture and combustion via an internal combustion engine and electricity generation system;

d) emissions from gas capture and combustion via a gas boiler used to heat water or generate stream; and

e) emissions from gas capture and combustion via flaring.

Figure 1 illustrates the greenhouse gas sources included in the greenhouse gas assessment boundary.
3.3 Calculating the baseline for the offsets project

This section specifies the process for identifying a project baseline as required under paragraph 106 (4) (f) of the Act. The project baseline is the amount of methane that would have been generated and released into the atmosphere from the uncovered lagoons included in the project for each year, in the absence of the abatement activity. The project baseline will be used to cap the amount of captured and combusted methane that can be claimed as emissions abatement.

The amount of methane that would have been generated and released into the atmosphere from uncovered lagoons is calculated based on the amount of Volatile Solids (VS) in the effluent stream deposited into the lagoons in the project. The amount of VS in the effluent stream is estimated using the PigBal model developed for Australian conditions. PigBal estimates of VS are based on the number of animals (in various classes), the feed mix used, climatic conditions and the waste pre-treatment system (before entry of effluent into the lagoon) during the year.

The methodology determination requires project proponents to use Version 2.14 of PigBal.

The full range of parameters required to calculate VS entering the project lagoons (which is used to calculate baseline methane emissions) is accounted for in the PigBal model. The PigBal model is an appropriate tool for estimating VS from piggeries because it represents industry best practice and is the method used to estimate VS (and hence methane) from piggeries in Australia’s National Greenhouse Accounts. The Methodology Determination specifies that PigBal Version 2.14 is the version that applies.

Many piggery managers already collect most of the information required for entry into the PigBal model in the normal course of operations. Methane emissions will be calculated from VS using the maximum methane-producing capacity from VS (Bo) and the methane conversion factors used in compiling Australia’s National Greenhouse Accounts.

The process for estimating the project baseline further assumes that the sludge disposal practices are not changed due to the abatement activity. De-sludging involves pumping the sediment from the lagoon and removing it for drying, and in some circumstances processing (for example, composting) prior to subsequent use. The quantity of sludge generated within the covered lagoon will not exceed the quantity generated in an uncovered lagoon and therefore the practice itself and the amount of energy used for de-sludging will not change as a result of the lagoon being covered. For this reason, emissions from stationary energy or fuel use associated with waste disposal are not included in the project baseline.
Division 3.2 Calculations

This Division includes a detailed description of the formulas used for calculating net greenhouse gas abatement and explanations of the parameters included in each formula, along with a description of how each parameter is derived.

3.4 General

This section clarifies that all calculations must be done at least once every 12 months.

Subdivision 3.2.1 Calculating the baseline emissions ($E_b$)

Paragraph 106 (4) (f) of the Act provides that a methodology determination must specify a method for calculating the baseline for a project. This subdivision outlines equations required to calculate the baseline.

3.5 Calculating the baseline emissions using Equation 1.1

Equation 1.1 requires the prior calculation of:

- the volume of methane that would be released into the atmosphere from the operation of uncovered anaerobic treatment lagoons within the project site, in the absence of the project using Equation 1.2.

3.6 Calculating the volume of methane released in the absence of the project using Equation 1.2

Equation 1.2 requires the prior calculation of:

- the quantity of VS entering the project lagoons in kilograms, which is calculated using the PigBal model in accordance with the PigBal Manual.

The amount of VS is multiplied by two default factors, Bo, which is the maximum methane producing capacity from VS in pig waste effluent, and MCF, which is the methane conversion factor which reflects the portion of Bo that is achieved under temperature and treatment specifications.

Baseline calculations in Equations 1.1 and 1.2 are consistent with those used to compile Australia’s National Greenhouse Accounts.

Subdivision 3.2.2 Calculating the carbon dioxide equivalent net abatement amount

Paragraph 106 (1) (c) of the Act provides that a methodology determination must specify a method for calculating the carbon dioxide equivalent (CO2-e) net abatement amount for the project in relation to a reporting period.
3.7 Calculating the carbon dioxide equivalent net abatement amount using Equation 2.1

Equation 2.1 requires the prior calculation of:

- the quantity of methane emissions avoided as a consequence of the project, less the nitrous oxide emissions resulting from the destruction of methane, using Equation 2.2; and
- emissions from fuel and/or electricity used to operate gas capture and combustion equipment using Equation 4.1

Subdivision 3.2.3 Calculating \( A_p \)

3.8 Calculating the quantity of methane emissions avoided as a consequence of the project \( (A_p) \) using Equation 2.2

Equation 2.2 requires prior calculation of:

- the capped volume of methane destroyed by combustion device \( h \) using Equation 2.3; and
- the quantity of nitrous oxide emissions released as a result of methane destruction from all combustion devices using Equation 2.5

Using Equation 2.2, the methodology determination allows for methane to be destroyed using a flaring, electricity generation or gas boiler system or any combination of these systems.

Note that where the amount of methane destroyed by an internal combustion engine for electricity generation is calculated based on the amount of electricity produced by the internal combustion engine generator measured in megawatt hours using Equations 3.2 and 3.3, the methodology only permits a single internal combustion engine generator to be used to combust the methane. No other combustion devices can be used under these circumstances.

Subdivision 3.2.4 Calculating \( Q_{com,h} \)

3.9 Calculating the volume of methane destroyed by the combustion device using Equation 2.3

Equation 2.3 requires prior calculation of:

- the capped volume of methane sent to combustion device \( h \) using Equation 2.4; and
- the methane destruction efficiency for device \( h \).

When determining the methane destruction efficiency of the combustion device, project proponents can elect to use either a default value of 0.98 for flaring systems, internal combustion engines or gas boilers or to measure methane destruction efficiency in accordance with Division 3.3 of the Methodology Determination for flaring systems or internal combustion engines.
Project proponents can only use the default value where the equipment is being or has been installed and operated in accordance with the manufacturer’s requirements.

**Subdivision 3.2.5 Calculating Q\textsubscript{CH4,h}**

3.10 Calculating the capped volume of methane sent to combustion device h using Equation 2.4

Equation 2.4 requires the prior calculation of:

- the volume of biogas sent to combustion device h adjusted to standard conditions. Where volumetric measurements have not been adjusted to standard conditions based on actual temperature and pressure readings of the biogas this must be multiplied by 0.97 before the portion of the volume of the biogas that is methane can be measured; and

- the proportion of the volume of the biogas that is methane.

To calculate the proportion of the volume of the biogas that is methane, project proponents may elect to either use a default value of 0.70 in accordance with the NGER Determination or the proportion of methane may be measured in accordance with Division 3.3 of the Methodology Determination.

3.11 Capping the volume of methane

This section clarifies that the volume of methane sent to the combustion device must not be greater than the value for baseline methane emissions.

**Subdivision 3.2.6 Calculating E\textsubscript{N\textsubscript{2}O}**

3.12 Calculating nitrous oxide (E\textsubscript{N\textsubscript{2}O}) emissions using Equation 2.5

Equation 2.5 requires input of the amount of capped volume of methane destroyed by combustion device h, as calculated earlier in Equation 2.3.

Where the amount of methane destroyed by an internal combustion engine for electricity generation is calculated based on the amount of electricity produced by the internal combustion engine generator measured in megawatt hours using Equations 3.2 and 3.3, the quantity of nitrous oxide emissions from internal combustion engine must be calculated using the Equation in subsection 3.12 (2).

**Subdivision 3.2.7 Calculating emissions combusted in an internal combustion engine**

This subdivision outlines the alternative approaches that must be taken if an internal combustion engine is used and the project proponent chooses to calculate the quantity of methane destroyed by an internal combustion engine based on the energy used for the generation of electricity measured in megawatt hours.
3.13 Calculating the quantity of methane emissions avoided as a consequence of the project \((A_p)\) – optional calculations using Equation 3.1

In circumstances where a proponent chooses to calculate the quantity of methane destroyed by the internal combustion engine based on the amount of electricity produced by the internal combustion engine generator measured in megawatt hours and only one internal combustion engine and no other combustion devices are used, Equation 3.1 must be used instead of Equation 2.2.

Equation 3.1 requires the prior calculation of:

- the amount of methane destroyed as a consequence of an internal combustion engine using Equations 3.2 and 3.3.

Equation 3.2 requires prior calculation of:

- the energy content of the methane sent to the internal combustion engine using Equation 3.3.

**Subdivision 3.2.8 Calculating emissions from fuel and grid-derived electricity used to operate the gas extraction system in the project \((Y_p)\)**

3.14 Calculating emissions from electricity and fuel use using Equation 4.1

Equation 4.1 requires prior calculation of:

- The total emissions from fuel use using Equations 4.2 and 4.3; and
- The total emissions from consumption of purchased electricity used to operate the gas capture and combustion system using Equation 4.4.

3.15 Calculating total emissions from fuel use \((E_f)\) using Equations 4.2 and 4.3

Calculation of the total emissions from fuel use using Equation 4.2 requires emissions to be calculated for each fuel type and each greenhouse gas type.

Equation 4.3 is calculated as the sum of all emissions that have been calculated using Equation 4.2.

3.16 Calculating emissions from the consumption of purchased electricity \((E_{elec})\) using Equation 4.4

Emissions from the consumption of purchased electricity is calculated based on the quantity of electricity used and an emissions factor, as outlined in the NGER Determination.

**Division 3.3 Data Collection**

3.17 Data collection procedures and measurement frequency

The effect of paragraph 106 (3) (c) of the Act is that a Methodology Determination may require the project proponent of an eligible offsets project to comply with specified record-
keeping requirements relating to the project. A project proponent for an eligible offsets project who fails to comply with a record-keeping requirement relating to the project will have contravened a civil penalty provision (section 193 of the Act).

This Division provides the data collection methods for deriving the parameters used to calculate greenhouse gas emissions and removals and project emissions and removals. The Division describes the data collection method, unit of measurement, measurement procedure and measurement frequency for each parameter used to calculate project emissions. It includes data collection requirements for PigBal inputs used to determine VS as well as data collection used in abatement calculations.


### 3.18 Volumetric measurement

This section of the Methodology Determination provides the details required for measuring the volume of biogas sent to a combustion device.

### 3.19 Measurement of methane in biogas

This section includes requirements for the recording of data when measuring the portion of the volume of biogas that is methane.

### Part 4 Monitoring and reporting

**Division 4.1 Project Monitoring**

#### 4.1 Application

The effect of paragraph 106 (3) (d) of the Act is that a Methodology Determination may require the project proponent of an eligible offsets project to comply with specified requirements to monitor a project.

A project proponent for an eligible offsets project who fails to monitor a project in accordance with any monitoring requirements in the applicable Methodology Determination will have contravened a civil penalty provision (section 194 of the Act).

#### 4.2 Monitoring requirements

This section sets out requirements for recording inputs in PigBal and specifications for measurement equipment used for a project.

#### 4.3 Quality assurance and quality control

This section sets out requirements relating to inspection and maintenance of monitoring and other technical equipment used in a project.
Division 4.2 Record Keeping Requirements

The effect of paragraph 106 (3) (c) of the Act is that a Methodology Determination may require the project proponent of an eligible offsets project to comply with specified record-keeping requirements relating to a project.

4.4 Records that must be kept

This section of the Methodology Determination specifies the records that must be kept in relation to the project.

Division 4.3 Offsets report requirements

The effect of paragraph 106 (3) (a) of the Act is that a Methodology Determination may require the project proponent of an eligible offsets project to comply with specified requirements to include information relating to the project in each offsets report about the project.

4.5 Offsets reports

This section of the Methodology Determination provides that project proponents must submit reports, and sets out the information that must be included in those reports.

Under this section, project proponents are required to submit:

(a) a report for the first reporting period; and

(b) ongoing reports for subsequent reporting periods.

This section also sets out information that must be included in the first project report.

4.6 Subsequent reporting periods

This section sets out information that must be included in the subsequent project reports.
Statement of Compatibility with Human Rights

Prepared in accordance with Part 3 of the Human Rights (Parliamentary Scrutiny) Act 2011

Carbon Farming (Destruction of Methane Generated from Manure in Piggeries)
Methodology Determination 2012

This Legislative Instrument is compatible with the human rights and freedoms recognised or declared in the international instruments listed in section 3 of the Human Rights (Parliamentary Scrutiny) Act 2011.

Overview of the Legislative Instrument

The Carbon Farming (Destruction of Methane Generated from Manure in Piggeries) Methodology Determination 2012 (the Methodology Determination) sets out the detailed rules for implementing and monitoring projects under the Carbon Farming Initiative (CFI) to reduce the methane generated from manure in piggeries.

Project proponents who want to implement the Methodology Determination must make an application to the Clean Energy Regulator (the Regulator) and meet the eligibility requirements set out under the Carbon Credits (Carbon Farming Initiative) Act 2011. Offsets projects that are approved by the Regulator can generate Australian carbon credit units that can be sold to:

- Australian companies that must pay the carbon price established under the Clean Energy legislation when implemented;
- overseas entities that pay a carbon price; and
- businesses in Australia and overseas wanting to offset their own carbon pollution.

Human rights implications

This Legislative Instrument does not engage any of the applicable rights or freedoms.

Conclusion

This Legislative Instrument is compatible with human rights as it does not raise any human rights issues.

Mark Dreyfus, Parliamentary Secretary for Climate Change and Energy Efficiency